



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,247	08/26/2003	Hajime Yamamoto	031029	1773

38834 7590 06/15/2007  
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP  
1250 CONNECTICUT AVENUE, NW  
SUITE 700  
WASHINGTON, DC 20036

EXAMINER
----------

CHACKO DAVIS, DABORAH

ART UNIT	PAPER NUMBER
----------	--------------

1756

MAIL DATE	DELIVERY MODE
-----------	---------------

06/15/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/647,247	<b>Applicant(s)</b> YAMAMOTO ET AL.	
	<b>Examiner</b> Daborah Chacko-Davis	<b>Art Unit</b> 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3 and 5-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3 and 5-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Applicant's Request for Withdrawal of Finality of office action, filed May 16, 2007, for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3, 5-6, 8-15, and 18-19, are rejected under 35 U.S.C. 102(b) as being anticipated by EP 1152036 (Kanda et al., hereinafter referred to as Kanda).

Kanda, in the abstract, in [0001], [0022], [0023], [0024], [0025], [0026], [0034], [0035], and in Table I, discloses forming a semiconductor device by forming a resist pattern on the substrate, coating the resist pattern with a resin composition (resist pattern smoothing material) and subjecting the coated resist pattern to a heat treatment, wherein the thickness of the resin coated onto the resist pattern and the heat treatment is adjusted (suitably determined), followed by developing the coating layer (smoothing layer) resulting in the smoothed resist pattern (resist pattern with smooth side walls, wall surfaces etc) (claims 1, and 20). Kanda in [0031], [0032], [0033], [0034], [0035], [0036], [0037], and in Table 1, discloses that the resist patterns formed are without fish eyes or striations at all, i.e., the average opening dimension is greater than 90% of the

Art Unit: 1756

predetermined opening dimension, and Table I (indicating the characteristics) of Kanda reveals that the maximum and minimum opening dimensions (resist openings that are smoothed, without striations and are uniform) are within a range of  $\pm 3\%$  of the predetermined opening dimension. Kanda, in [0023], discloses that the resist is an ArF resist (claims 3, 5, and 6). Kanda, in [0023], discloses that the coating layer is heated in the claimed range (80 - 100°C) (claim 8). Kanda, in [0006], and [0007], discloses that the water-soluble resin composition (coating layer) includes a resin, a surface-active agent, and a crosslinking agent, and is water-soluble (claims 10-11). Kanda, in [0016], discloses that the surfactant is a non-ionic surfactant such as an alkoxylate compound (ethoxylate compound) or alcohols (claims 12-13). Kanda, in [0009], and [0011], discloses that the resin is a polyvinyl alcohol, the crosslinking agent is a melamine derivative, and the claimed resin (Claims 14-15). Kanda, in [0019], discloses that the organic solvent is an alcohol solvent (claim 19).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 7, is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1152036 (Kanda et al., hereinafter referred to as Kanda) in view of U. S. Patent No. 6,043,145 (Suzuki et al., hereinafter referred to as Suzuki).

Art Unit: 1756

Kanda is discussed in paragraph no. 2.

The difference between the claim and Kanda is that Kanda does not disclose that the smoothed resist pattern has an opening dimension within the range of 50nm to 150nm (claim 7).

Suzuki, in col 4, lines 38-45, discloses that the resist pattern dimensions are increasingly narrowed such that the width (opening dimension of a pattern) of the pattern is  $0.15\mu$  (i.e., 150nm).

Therefore, it would be obvious to a skilled artisan to modify Kanda by employing the opening dimension (width) suggested by Suzuki because Kanda, in [0036], discloses that the resist pattern width (opening of the LSI's) is reduced and smoothed and in [0002], and [0039], discloses that the LSI fabricated in the claimed method would possess reduced spaces (width) in the trenches or holes due to the thickening of the resist.

6. Claims 16-17, are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1152036 (Kanda et al., hereinafter referred to as Kanda) in view of U. S. Patent No. 6,537,719 (Takahashi) and U. S. Patent No. 6,555,617 (Tanaka et al., hereinafter referred to as Tanaka).

Kanda is discussed in paragraph no. 2.

The difference between the claims and Kanda is that Kanda does not disclose that the resist pattern smoothing material (resin composition) comprises one of a water-soluble aromatic compound and resin having an aromatic compound (claim 16). Kanda

Art Unit: 1756

does not disclose the water-soluble aromatic compound recited in claim 17, and does not disclose the resin aromatic compound recited in claim 17.

Takahashi, in col 6, lines 11-42, discloses that the alkali-soluble photosensitive composition (resin) can be aromatic and that the composition includes an aromatic compound such as alcohol derivatives of naphthalene (naphthol).

The difference between the claims and Kanda in view of Takahashi is that Kanda in view of Takahashi does not disclose that the claimed resin containing an aromatic compound.

Tanaka, in col 3, lines 16-64, discloses that the resin composition includes a polyvinyl aryl acetal resin (resin containing an aromatic compound).

Therefore, it would be obvious to modify Kanda by employing the aromatic compound suggested by Takahashi because Takahashi, in col 4, lines 8-16, in col 5, lines 7-20, and in col 6, lines 11-40, and in col 12, lines 40-47, discloses that employing the suggested aromatic phenolic resin is preferable for the formation of a radiation sensitive resin composition so as to enable combination with a fluorescent material without impairing the characteristics of the resist. It would be obvious to a skilled artisan to modify Kanda in view of Takahashi by employing the resin containing the aromatic compound because Kanda in [0009], discloses that the resin composition includes a polyvinyl acetal resin, and Tanaka, in col 3, lines 35-56, and in col 5, lines 34-36, and in col 6, lines 38-43, discloses that the resin composition that includes the polyvinyl acetal resin is modified by including an aryl group in the polyvinyl acetal structural unit, and doing so improves the glass transition temperature and heat resistance of the modified

Art Unit: 1756

coating resin, and that the modified polyvinyl acetal aryl resin is applicable as a coating material due to its adhesiveness and film-forming properties.

### ***Double Patenting***

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 1-19 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-21 of copending Application No. 10/290,493. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claim forming resist pattern with smoothed or reduced edge roughness using the same method steps include applying a smoothing or resist pattern improving material to the resist pattern, heating and developing.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Response to Arguments***

9. Applicant's arguments filed January 16, 2007, have been fully considered but they are not persuasive. The 102 rejection and the Double patenting rejection made in the previous office action are maintained (paper no. 20061002).

A) Applicants argue that Kanda does not disclose the claimed opening dimension.

Kanda in [0031], [0032], [0033], [0034], [0035], [0036], [0037], and in Table 1, discloses that the resist patterns formed are without fish eyes or striations at all, i.e., the average opening dimension is greater than 90% of the predetermined opening dimension, and Table I (indicating the characteristics) of Kanda reveals that the maximum and minimum opening dimensions are within a range of  $\pm 3\%$  of the predetermined opening dimension (see paragraph no. [0035]).

***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status



Art Unit: 1756

information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

*Deborah L. Hall*  
June 12, 2007.